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10/589,158

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Martin Seemann

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LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

EXAMINER

AKRAM, IMRAN

ART UNIT

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/589,158 | Applicant(s) SEEMANN ET AL. | |
| | Examiner IMRAN AKRAM | Art Unit 1795 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/7/07, 9/5/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Independent claims 9 and 23 recite the limitation "a concentration of H₂/CO in the initial gas mixture in the range of 0.25 to 5." These values are arbitrary without units, however, and the specification uses the same language. It is impossible to ascertain whether the values of 0.25 and 5 are ratios between hydrogen to carbon monoxide or a percentage of hydrogen and carbon monoxide in the initial gas mixture. If the latter, then it is unclear whether the entire concentration of hydrogen and carbon monoxide is 0.25% (or 5%) or each the hydrogen and carbon monoxide concentration is 0.25% (or 5%). Again, the specification does not provide any further details.
4. Similarly, claims 9 and 23 also recites "the feed gas further comprising unsaturated C₂ components and aromatic hydrocarbons in the range of 1 to 10 vol%." It is unclear as to whether both the unsaturated C₂ components and the aromatic hydrocarbons are 1 to 10 vol% of the total feed gas or each makes of 1 to 10% of the total feed gas. Claim 20 presents a similar problem. Claims 10-22 and claims 24-28 depend from rejected claims 9 and 23, respectively.

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5. Claim 11 recites the limitation "the nickel compound" in lines 1 and 2. The claim on which claim 11 depends, claim 10, need not include a nickel compound. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 21 recites the limitation that "the feed gas mixture is selected from the group consisting of: benzene, toluene, and naphthalene." However, claim 9, on which it depends, discloses that the feed gas mixture is a mixture of multiple components. The feed gas mixture cannot therefore be simply benzene, toluene, or naphthalene. Claim 21 also uses the word "consisting," implying that the feed gas mixture can be only one of benzene, toluene, and naphthalene.

7. Claim 22 recites the limitation "wherein the feed gas is in the range of 1 to 5 vol%." However, feed gas is the only claimed input into the process, so it is impossible to ascertain what it is 1 to 5 vol% in relation to.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 9-20 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Child in view of Broecker.

12. Regarding claims 9-20 and 22, Child discloses providing a syngas comprising CH₄, H₂, CO₂, CO, and steam with an H₂/CO of 1.0-2.5 (column 3, lines 57-63), contacting the syngas with fluidized bed comprising catalyst particles at 20 to 1000 microns at 315 to 815°C, 1 atm (~1 bar), a space velocity of 80 to 10,000 per hour, and a residence time of 0.5 to 10 seconds (column 6, lines 1-24). The catalyst bed comprises 33 to 78 weight percent nickel oxide on an alumina base (column 7, lines 41-47). Child does not disclose the use of C₂ hydrocarbons in the feed gas mixture (syngas), however. Broecker—in an invention for the production of methane from syngas—discloses that the feed gas mixture can contain aromatic hydrocarbons of up

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to 20% depending on the feedstock desired (column 3, line 57 to column 4, line 2) and unsaturated and aromatic compounds in the range of 1 to 10% by volume (column 11, lines 60-66). It would have been obvious to one having ordinary skill in the art at the time of invention to add aromatics and unsaturated carbons as in Broecker to the feedstock (syngas) of Child were they a desired feed for the conversion to methane.

13. Regarding claims 23-28, Child discloses providing a syngas comprising CH_4 , H_2 , CO_2 , CO , and steam with an H_2/CO of 1.0-2.5 (column 3, lines 57-63), contacting the syngas with fluidized bed comprising catalyst particles at 20 to 1000 microns at 315 to 815°C, 1 atm (~1 bar), a space velocity of 80 to 10,000 per hour, and a residence time of 0.5 to 10 seconds (column 6, lines 1-24). The catalyst bed comprises 33 to 78 weight percent nickel oxide on an alumina base (column 7, lines 41-47). Child does not disclose the use of C_2 hydrocarbons in the feed gas mixture (syngas), however.

Broecker—in an invention for the production of methane from syngas—discloses that the feed gas mixture can contain aromatic hydrocarbons of up to 20% depending on the feedstock desired (column 3, line 57 to column 4, line 2) and unsaturated and aromatic compounds in the range of 1 to 10% by volume (column 11, lines 60-66). It would have been obvious to one having ordinary skill in the art at the time of invention to add aromatics and unsaturated carbons as in Broecker to the feedstock (syngas) of Child were they a desired feed for the conversion to methane.

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14. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Child and Broecker as applied to claim 9 above, and further in view of Aldridge (US 3,838,994).

15. Neither Child nor Broecker discloses the use of benzene or toluene. Aldridge—in an invention for the production of methane from produced syngas—discloses that benzene and toluene are byproducts when syngas is created from light hydrocarbons (column 5, lines 34-53). It would have been obvious to one having ordinary skill in the art at the time of invention for the aromatics of Child and Broecker to be toluene and benzene as these are common byproducts of the similar syngas generation process of Aldridge.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN AKRAM whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/I. A./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795